

## WHAT IS CLAIMED IS:

1. An optical transmission and receiver module comprising:

at least one light emitting device for emitting light having a first  
5 wavelength which is to be incident on an optical transmission medium;

at least one light receiving device for receiving light emitted from said  
optical transmission medium and having a second wavelength different from  
the first wavelength;

an optical path routing element for converging the optical path of light  
10 having the first wavelength and the optical path of light having the second  
wavelength on the optical transmission medium side and for separating the  
optical path of light having the first wavelength on the side of said at least  
one light emitting device and the optical path of light having the second  
wavelength on the side of said at least one light receiving device in the  
15 directions of said at least one light emitting device and said at least one light  
receiving device, respectively; and

a lens transparent to both of light having the first wavelength and light  
having the second wavelength, the lens being provided between said optical  
transmission medium and said optical path routing element.

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2. An optical transmission and receiver module according to claim 1,  
wherein the number of the light receiving devices is equal to the number of the  
light emitting devices.

3. An optical transmission and receiver module according to claim 1,  
wherein said optical path routing element comprises a transmission-reflection  
part which allows either of light having the first wavelength and light having  
5 the second wavelength to pass through said transmission-reflection part and  
which reflects the other light, and a reflection part which reflects said other  
light.

4. An optical transmission and receiver module according to claim 3,  
10 wherein said transmission-reflection part is provided with a multilayer film  
made of a dielectric material.

5. An optical transmission and receiver module according to claim 1,  
wherein said optical path routing element allows light of the first wavelength  
15 emitted from said at least one light emitting device to pass through said  
optical path routing element, and changes the optical path of light having the  
second wavelength so as to be led to said at least one light receiving device.

6. An optical transmission and receiver module according to claim 1,  
20 wherein optical path routing element changes the optical path of light having  
the first wavelength emitted from said at least one light emitting device so as  
to be led to said optical transmission medium, and allows light having the  
second wavelength input to said at least one light receiving device to pass

through said optical path routing element.

7. An optical transmission and receiver module according to claim 1, further comprising a monitoring light receiving device.

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8. An optical transmission and receiver module according to claim 1, further comprising an amplifier for amplifying the output of said at least one light receiving device.

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9. An optical transmission and receiver module according to claim 1, further comprising:

a pole for supporting said optical path routing element;

a bench for mounting said pole; and

a cap for covering said pole and said mounting part such that said at least one light emitting device, said at least one light receiving device, and said optical path routing element are accommodated therein,

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wherein said lens is provided in said cap such that the central axis of said lens coaxially coincides with the optical axis of said optical transmission medium.

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10. An optical transmission and receiver module according to claim 3, further comprising:

a pole for supporting said optical path routing element;

a mounting part provided with said pole; and

a cap for covering said pole and said mounting part such that said at least one light emitting device, said at least one light receiving device, and said optical path routing element are accommodated therein,

5        wherein said lens is provided in said cap so that the central axis of said lens coaxially coincides with the optical axis of said optical transmission medium.

11. An optical transmission and receiver module according to claim 5,  
10 further comprising:

a pole for supporting said optical path routing element;

a mounting part provided with said pole; and

a cap for covering said pole and said mounting part such that said at least one light emitting device, said at least one light receiving device, and  
15 said optical path routing element are accommodated therein,

wherein said lens is provided in said cap so that the central axis of said lens coaxially coincides with the optical axis of said optical transmission medium.

20        12. An optical transmission and receiver module according to claim 6, further comprising:

a pole for supporting said optical path routing element;

a mounting part provided with said pole; and

a cap for covering said pole and said mounting part such that said at least one light emitting device, said at least one light receiving device, and said optical path routing element are accommodated therein,

wherein said lens is provided in said cap so that the central axis of said  
5 lens coaxially coincides with the optical axis of said optical transmission medium.

13. An optical transmission and receiver module according to claim 1,  
further comprising a coupling part capable of establishing optically coupling  
10 with an exterior unit, wherein said coupling part comprises a ferrule with an optical fiber, and a sleeve for holding said ferrule.

14. An optical transmission and receiver module according to claim 3,  
further comprising a coupling part for establishing optically coupling with an  
15 exterior unit, wherein said coupling part comprises a ferrule with an optical fiber, and a sleeve for holding said ferrule.

15. An optical transmission and receiver module according to claim 5,  
further comprising a coupling part for establishing optically coupling with an  
20 exterior unit, wherein said coupling part comprises a ferrule with an optical fiber, and a sleeve for holding said ferrule.

16. An optical transmission and receiver module according to claim 6,

further comprising a coupling part for establishing optically coupling with an exterior unit, wherein said coupling part comprises a ferrule with an optical fiber, and a sleeve for holding said ferrule.

5           17. An optical transmission and receiver module according to claim 9, further comprising a coupling part for establishing optically coupling with an exterior unit, wherein said coupling part comprises a ferrule with an optical fiber, and a sleeve for holding said ferrule.

10           18. An optical transmission and receiver module according to claim 10, further comprising a coupling part for establishing optically coupling with an exterior unit, wherein said coupling part comprises a ferrule with an optical fiber, and a sleeve for holding said ferrule.

15           19. An optical transmission and receiver module according to claim 11, further comprising a coupling part for establishing optically coupling with an exterior unit, wherein said coupling part comprises a ferrule with an optical fiber, and a sleeve for holding said ferrule.

20           20. An optical transmission and receiver module according to claim 12, further comprising a coupling part for establishing optically coupling with an exterior unit, wherein said coupling part comprises a ferrule with an optical fiber, and a sleeve for holding said ferrule.